June 17, 2015

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1001 "I" Street
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Re: Joint NGO Comments on *Short-Lived Climate Pollutant Reduction Strategy Concept Paper*

Dear Sirs:

On behalf of the undersigned conservation, public health and sustainable technology organizations, we thank you for the opportunity to comment on the *Short-Lived Climate Pollutant Reduction Strategy Concept Paper*, released on May 7th, 2015 and discussed during a May 27th public workshop. With current proposed global actions being insufficient to avoid global warming greater than the 2°C (3.6°F)[1]

[1] An assessment of current trends indicates that the world is on a trajectory to warm 3.6-4.2°C above pre-industrial levels by 2100. Factoring in individual national pledges, targets and INDCs, and currently implemented policy to reduce emissions, the world could warm 2.9-3.1°C by 2100. The INDCs submitted by the EU & G7 countries are estimated to accomplish only 20-30% of the reductions needed to keep warming within 1.5-2°C. See: http://www.climateactiontracker.org/

limit agreed to in Copenhagen[2] and Cancun,[3] it is critical – now more than ever – that California intensify its action to reduce the emissions of all climate pollutants. California's leadership can again demonstrate to the rest of the nation, and to the rest of the world, practical approaches to implementing a comprehensive strategy to fight accelerating global warming, while at the same time demonstrating the many: health, environmental and economic opportunities possible through such action. While the state explores deeper reduction targets for the long-lived climate pollutants which have been the main focus of the AB32 program to date, adopting an overarching strategy to reduce short-lived climate pollutants (SLCPs) will be necessary to provide a climate buffer until global efforts to cut emissions of long-lived climate pollutants can take effect.

OVERARCHING RECOMMENDATIONS FOR AN SLCP STRATEGY

We commend CARB staff for producing a clear, comprehensive and concise review of the issues as they relate to how California could approach developing a suite of strategies to significantly reduce the emissions of short-lived climate pollutants (SLCPs). We believe the *Concept Paper* chooses the correct overarching concepts to frame the development of the overall SLCP reduction strategy, in accordance with the requirements of SB 605 (Lara & Pavley, Chapter 523, Statutes of 2014). We agree that achieving science-based targets must be at the core of the strategy.

Evaluation of Reduction Targets

We hope that the forthcoming stakeholder process will include opportunities, with staff, to further evaluate and potentially extend some of the proposed targets. We strongly support the consideration of GWP_{20} for SLCPs, as this is more appropriate to the timescale of their impacts on climate and expands the scope (beyond GWP_{100}) for evaluating the best methods to account for the costs and benefits associated with proposed measures to reduce their emissions. We note, however, that the *Concept Paper* only includes the Intergovernmental Panel on Climate Change's (IPCC) most up-to-date estimate of the GWP values for black carbon from the Fifth Assessment Report (AR5), but not for other SLCPs. In keeping with the principle of using the best and most current science, we encourage CARB to extend the use of GWP values from AR5, beyond just black carbon, to include the other SLCPs.

We strongly support the prioritization of actions with diverse benefits and the pursuit of systems-level solutions that can enable deep, sector-wide emission reductions. Reducing SLCP emissions offers opportunities to reduce global and local climate change impacts while improving the air quality and health in communities most impacted by local sources of air pollution. Other beneficiaries of a sound SLCP reduction policy will include the energy, agriculture, recycling and freight sectors of our economy.

Greenhouse Gas Reduction Fund Investments

As the *Concept Paper* acknowledges, reducing SLCPs at the scale necessary to protect our air and climate will require substantial investments of both private and public funds. One important source of public funds is the Greenhouse Gas Reduction Fund. As CARB is currently embarking upon a new three-year

Also See: Todd Sanford, Peter C. Frumhoff, Amy Luers & Jay Gulledge,'The climate policy narrative for a dangerously warming world', Nature Climate Change 4, 164–166, (2014) doi:10.1038/nclimate2148

[2] http://unfccc.int/meetings/copenhagen_dec_2009/items/5262.php

[3] http://cancun.unfccc.int/cancun-agreements/significance-of-the-key-agreements-reached-at-cancun/#c45

Investment Plan for the AB 32 Auction Proceeds, we recommend that the Investment Plan designate projects that reduce SLCP emissions as a priority category for investment, and encourage CARB to work closely with state agencies to quantify the public health, environmental, economic and other co-benefits of such actions.

STRATEGIES TO REDUCE METHANE

The global warming emissions benefits of natural gas need serious further study. Methane leakage during the extraction, distribution, and refueling of vehicles has raised questions about the climate benefits of natural gas. Additional research on methane leakage is still needed in order to better understand its GHG emission impacts. For example, recent research has shown that – without additional efficient controls on methane leakage – the use of natural gas in power-plants and vehicles could potentially *have higher* GHG emissions than the technologies its use is meant to displace. One widely-cited analysis determined that system-wide leakage would have to total less than ~3% in order for natural-gas fired power-plants to provide a climate benefit over coal-fired power-plants.[4] Similarly, estimates for natural gas as a transportation fuel indicate that even lower system-wide leakage rates (<0.8-1.4% depending on the vehicle size and engine type) would be required in order for this source of methane to provide a climate benefit over petroleum-based fuels.[5] This suggests that in order to realize the benefits from its domestically produced oil and gas, California must not only build but also maintain a rigorous, robust and consistent regulatory system for tracking and reducing the state's emissions. It must also remain vigilant in monitoring and enforcing compliance within that regulatory framework.

Reducing Emissions from Oil & Gas

We strongly support the pursuit of new and additional strategies to investigate and reduce methane emissions from natural gas fuels to reduce its carbon footprint as well as strategies to transition to renewable natural gas that relies on sustainable, non-fossil feedstocks.

The state has made, and is making, extensive efforts to measure and monitor methane emissions within its borders, using everything from: flux chambers in the field; to ambient monitoring towers; to aircraft and vehicles in order to make direct physical measurements; and, terrestrial and satellite based remote sensing systems to spectroscopically measure methane emissions and detect hotspots. California has a significant oil and gas industry, with all of its attendant activities and infrastructure, and the state has begun developing a comprehensive system for the measuring and monitoring of methane emissions within its borders. However, roughly ninety percent of California's natural gas consumption is met through imports.[6] This poses a challenge in ensuring that robust approaches are also applied to deal with any fugitive emissions from oil and gas industry activities and infrastructure that lie outside the

[4] Alvarez, R. A., et al. (2012). Greater focus needed on methane leakage from natural gas infrastructure. PNAS. 109(17): 6435–6440. doi: 10.1073/pnas.1202407109 http://www.pnas.org/content/109/17/6435.full. The analysis in this report used GWPs from AR4 and have subsequently been updated using GWPs from AR5. See: http://www.energy.ca.gov/2014_energypolicy/documents/2014-06-23_workshop/presentations/13_O_Connor_EDF_IEPR-Presentation.pdf

[5] *Ibid.* Also See: Camuzeaux, et. al, 2015. Influence of Methane Emissions and Vehicle Efficiency on the Climate Implications of Heavy-Duty Natural Gas Trucks. ES&T 49(11): pp 6402–6410 DOI: 0.1021/acs.est.5b00412 http://pubs.acs.org/doi/full/10.1021/acs.est.5b00412.

[6] California Energy Almanac, http://energyalmanac.ca.gov/naturalgas/natural_gas_supply.html

state's borders,[7] so that there can be an accurate accounting of the life-cycle emissions of imported natural gas. Accordingly, we recommend that CARB work with and encourage not only the relevant federal agencies as noted in the *Concept Paper*, but also with the agencies in the states and provinces that are the sources of its natural gas, to develop robust regulatory schemes under their jurisdictions that can ensure the effective minimization of methane emissions from their oil and gas industries.

At the same time, as part of the development of the inspection and maintenance requirement in its own Oil and Gas methane regulations, CARB should strengthen its proposal to require only annual inspections for leak detection and repair. CARB should instead adopt, at a minimum, quarterly leak inspections consistent with the practice in Colorado, Ohio and Wyoming.[8] More frequent inspections will not only result in faster leak detection, it will reduce the potential for any long-lived superemitters.[9]

Reducing Emissions from Biogenic Sources

Eliminate the Disposal of Organic Waste

We strongly support the organic waste diversion goals proposed in the *Concept Paper*, and encourage CARB to adopt clear regulatory measures to implement these goals.

The only way to truly minimize fugitive methane emissions from landfills is to divert the methane-generating organic waste to other end uses. Organic materials comprise two-thirds of the waste stream and even the best landfills only capture half to three quarters of the gas while they operate, and no gas capture system can capture emissions before it is installed or for the decades after it is removed. When managed outside the landfill, these same materials can be composted and/or digested under controlled conditions, which not only prevents the generation of landfill methane but also creates products that reduce greenhouse gas emissions when they are used.

This underscores the importance of achieving the target identified in the Scoping Plan: virtually eliminating the landfill disposal of organic waste by 2025 (with an interim goal of 75% reduction by 2020). The only way to achieve these goals is to prohibit the disposal of organic waste in landfills, and CARB should implement this policy as soon as possible since education and enforcement efforts take many years before yielding real behavior change.

This policy is consistent with similar actions: in Europe (where the landfilling of organic waste was prohibited through an EU directive); in the 23 U.S. states that have passed prohibitions on landfilling yard trimmings; and in the various cities and counties around the country that have some form of organics disposal ban, such as San Francisco's prohibition on organics disposal and Alameda County's plant debris ban.

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[7] For a summary of industry activity and infrastructure see: http://www.energy.ca.gov/2014_energypolicy/documents/2014-06-23_workshop/presentations/15_Shears_CEERT_NGA_Production_and_CH4_Emissions_IEPR_Workshop_06-23-14.pdf

[8] See, e.g., Sierra Club et al., "Comments on ARB draft regulation for methane pollution from the oil and gas sectors," at 2 (May 15, 2015) (recommending monthly facility-wide inspections). Also see: Clean Water Action et al, "Comments on 'Proposed Regulation Order Article 3: Greenhouse Gas Emission Standards for Crude Oil and Natural Gas Facilities'", at 2.

[9] eg. See: Brandt et. al., 2014. Methane leaks from North American natural gas systems. Science: 343(6172): 733-735, DOI: 10.1126/science.1247045 http://www.sciencemag.org/content/343/6172/733.summary?sid=cd4e6f16-3ba4-4e62-b1b7-eb9dcfc1088c

Regulate Fugitive Landfill Methane Emissions

We support the adoption of further regulations to control the fugitive emissions from landfills. At the time of the adoption of CARB's Discrete Early Action Measure targeting landfills, the Board had identified this regulation as the first phase in a three-phase regulatory strategy. However, no further action has been taken to address the latter two phases. In fact, the Early Action Measure only required the installation of new gas collection systems at 41 smaller landfills that previously lacked gas capture, and did very little to further reduce the emissions from the 95% of waste in place that is at a landfill with gas capture.

Even with a complete elimination of the disposal of organic waste, landfills will continue to generate emissions for decades to come as the previously interred waste decomposes. We hope to work with staff on the specific elements of a new landfill gas regulation which we recommend include: lower surface methane concentration limits; early closure of individual landfill cells; and the implementation of advanced measurement technologies.

Reduce Methane Emissions from Dairies and Maximize Resource Recovery from Wastewater Treatment

As noted in the *Concept Paper,* the agricultural rearing of ruminant animals (predominantly dairy cattle) and waste water treatment plants together account for over 60% of California's methane emissions. We strongly support CARB working to assist the dairy industry in developing strategies to significantly reduce both enteric emissions and emissions from manure management. We urge that CARB independently investigate and include additional control options that would ultimately decarbonize the dairy industry.

In recognizing that California is currently suffering an extreme drought and its hydrology may be drier in the future than in the last century, we would support a program incentivizing dairies to move away from flush to scrape systems because, as noted in the *Concept Paper*, this not only helps reduce methane emissions but also water use. While CARB has, as one of the goals, the use of the manure in anaerobic digesters to produce methane for energy use, the difficulty of cleaning up the resulting biogas to bio-methane so that it can be used in power generation has proved to be nettlesome. The clean-up of the biogas has often proved to be one of the most challenging, and expensive steps, in consistently producing a fuel clean enough to avoid degradation of the genset. CARB should work with the other relevant agencies (CEC, CDFA, etc.) and the local air districts to explore the use of bioreactors as a means of cleaning up the biogas.[10] At the same time, we recommend that CARB explore whether bioreactors (possibly even the same bioreactors) could be used to clean up the enteric emissions affecting both climate and air quality, if those emissions could be collected from animals when they are housed within enclosed freestall barns. Ideally any biomethane produced should be used to generate power from a zero or near-zero emissions device such as a fuel-cell or appropriately equipped microturbine system, assuming the biomethane is not intended for use as a transportation fuel.

Wastewater treatment plants (WWTPs) not only present an opportunity to divert organics from landfills but also from some of California's dairies. Past research funded under the CEC's PIER program identified synergies where large dairies, food processing facilities, and WWTPs were in close proximity to each

[10] The Inland Empire Utility Agency has participated in research to explore the use of bioreactors to clean-up biogas for energy use.

other.[11] Codigestion was also found to produce higher biogas yields than when each waste feedstock is digested separately. CARB should work with CalRecyle, the CEC and local agencies to encourage or incentivize any WWTPs with spare capacity, that have not already done so, to develop codigestion projects using waste from local food processors and/or dairies. CARB should ensure that any renewal, retooling, and/or replacement of WWTPs maximizes the potential for codigestion opportunities with other sources of organic waste, whether that be from food-processing facilities, organics that would previously have gone to landfills or from local dairies or other CAFOs (confined animal feeding operation).

We caution that certain approaches to microbial intervention (such as the use of ionophores, bacteriocins, etc.) in order to reduce methanogenesis in the rumen could potentially interfere with the anaerobic digestion process needed to produce biogas for fuel.

STRATEGIES TO REDUCE BLACK CARBON

Existing policies, especially CARB's Diesel Risk Reduction Plan and highly successful local air district wood-burning restrictions, have made great progress in reducing emissions of particulate matter and black carbon. But further progress is essential to ensuring that California can meet its health-protective air quality and climate targets.

Sustainable Freight

The freight sector accounts for about half of statewide emissions of diesel PM, so cleaning up the goods movement systems is vital to the effort to reduce black carbon emissions. Since this industry makes it unsafe to breathe in the many neighborhoods adjacent to freight facilities, contributes heavily to our regional pollution problems, and will continue to increase in its share of climate pollution, California must act now. Board Members have directed CARB staff to develop a Sustainable Freight Strategy, and on April 23rd the Board approved staff's discussion draft, "Sustainable Freight: Pathways to Zero and Near-Zero Emissions."[12] Now CARB needs to move forward rapidly over the next 2-3 years to implement the near-term measures listed in that document, which included incentives emphasizing zero emission technologies, new regulations and expanded enforcement.

Additionally, CARB should, in coordination with the air districts, research, design, and adopt a facility-based emissions-cap approach for all types of major freight hubs and facilities. For decades, residents around freight hubs (i.e. railyards, ports, warehouses, airports) have suffered disproportionately from breathing toxic air, including unhealthy quantities of PM. A tool similar to an Indirect Source Review rule would establish caps on the total emissions from all sources operating at the hub or facility.

Furthermore, we urge CARB to continue working with the energy and transportation agencies and the business development office on the full Sustainable Freight Strategy. An integrated State planning process is necessary to accomplish the full transformation of the goods movement system, and many of the essential actions are outside of CARB's jurisdiction.

[11] See eg.: Final report for the PIER Commonwealth Biogas/PV Mini-Grid Renewable Resources RD&D Program: Project 3.1 Co-Digestion Of Dairy Manure/Food Processing Wastes And Biosolids/Food Processing Wastes To Energy. http://www.energy.ca.gov/2007publications/CEC-500-2007-015/CEC-500-2007-015.PDF

[12] http://www.arb.ca.gov/gmp/sfti/Sustainable_Freight_Draft_4-3-2015.pdf

Light Duty Vehicle Emission Controls

CARB's Advanced Clean Cars standards adopted in 2012 included a health protective standard of 1 milligram per mile for fine particle emissions; to be phased in between 2025 and 2028. In adopting the particle emissions standard, the Board also directed staff to evaluate the possibility of moving the phase-in period to begin in 2022 and achieve full implementation of 1 mg/mile by 2025. With successful progress being made toward measuring fine particles to inform the discussion,[13] and light duty gasoline particle filter technologies being deployed in European markets, the Board should move quickly to bring the phase-in of this health protective standard earlier forward to 2022-2025 to ensure that the health- and climate-threatening fine particles and black carbon emissions from California's light duty vehicles are controlled as soon as possible.

Further, the Board must continue to maintain focus on strong implementation of the Zero Emission Vehicle mandate to 2025 and beyond as a key driver to reducing harmful pollutant emissions. The Board's work to ensure the rapid transformation of the light duty fleet to zero emissions is critical in advancing the technologies that will help to inform the development of medium- and heavy- duty fleet applications.

Biomass Burning at Residences

CARB could play an important role, through promoting best practices, research and possibly incentive funding, in supporting local air districts that are acting to reduce emissions from biomass burning. The Bay Area Air Quality Management District is currently considering a new rule to ban all wood burning devices in new construction and restrict the sale of buildings with old wood-burning devices that fail to meet USEPA standards.

Biomass Burning in Forests

Forests are different from other sources of short-lived climate pollutants like fluorinated gases from industrial refrigerants, methane from cattle operations, and black carbon from diesel engines, in that forests and forest fires are natural components of the global carbon cycle, and fire is a natural and necessary component of many forest ecosystems in California. Actions that seek to influence forest structures and natural processes like fire are going to have a range of effects on forest ecosystems, wildlife, air quality and water, at multiple scales; effects that need to be considered in the development of measures.

We strongly support CARB's proposal to explore research into prescribed fire, and this effort should not be confined to the context of reducing fire risk. We urge that measures adopted as part of the SLCP reduction strategies integrate with efforts to increase forest carbon storage and work at a watershed or regional scale to allow for fire across substantially large areas at mixed severity.

[13] CARB, October 23, 2014. Update to the Board: Advanced Clean Cars Program Midterm Review. http://www.arb.ca.gov/board/books/2014/102314/14-8-2pres.pdf

Restoring natural structural diversity and fire to forests, at multiple scales, is essential to promoting and achieving the goals of increased forest carbon stocks, enhanced habitat, and improved watershed health. Forest-related measures must include the goal that forest ecosystems include the full range of naturally occurring habitat types, including complex early seral and complex late seral conditions.

Forest strategies must be integrated with and support well-functioning natural systems. To avoid unintended consequences and foster multiple benefits, forest-related goals must include criteria for evaluating associated environmental impacts and benefits, including wildlife habitat, structural diversity, and stream and watershed health. Furthermore, such strategies must be well-coordinated with local air quality management efforts to avoid unintended impacts on local health.

Efforts to Influence Emissions from Forest Fires Must Account For All Climate-Relevant Effects

Forest thinning treatments, intended to reduce fuel loads and wildfire intensity, by definition remove a great deal of carbon from the forest. These activities reduce terrestrial carbon stocks at the same time that they reduce ongoing and future carbon sequestration at various scales. As with efforts to increase forest carbon sequestration, SLCP reduction strategies must account for carbon impacts at the site level, as well as regional and state scales. These methods should include all climate impacts – including short-term emissions and impacts to forest carbon stores, and be compatible with and include timescales relevant to both short-term and long-term climate goals.

The Low Carbon Fuel Standard Sustainability workgroup took up the issues of GHG accounting and carbon intensity for forest activities, issues that have much relevance to potential SLCP reduction measures. In those discussions, as in the supporting science, it has become clear that accounting for GHG impacts of forest activities is critical to determining the overall GHG impact and carbon intensity of the end use of forest-sourced materials. It has also become clear that, with respect to accounting for those GHG impacts, "one size does not and cannot fit all," and GHG impacts need to be determined at the project level.

"Sustainability" standards are not an adequate proxy for accurate carbon accounting. Nor does "sustainable forest management," as defined by CalFIRE for the purposes of SB 1122 (Rubio, Chapter 612, Statutes of 2012), or in reference to "sustainable harvest" criteria under California law, provide a framework for GHG accounting. SB 1122 required procurement of 50 MW of bioenergy using "byproducts of sustainable forest management" as fuel, but neither SB 1122 nor the PUC's decision implementing the statute attempted to assess the GHG impacts of feedstocks used by those facilities.

Estimating the Impacts on Fire Reductions is Highly Uncertain and Speculative

Reductions in fire extent and intensity, and thus in emissions, from forest thinning projects may be extremely hard to measure due to numerous confounding variables that also exert a great influence on fire behavior (such as temperature, humidity, wind, and precipitation). CARB will need to address these research needs and data gaps in order to develop an accurate accounting of the GHG impacts of all forest strategies implemented pursuant to AB 32 and SB 605. In the context of the SLCP reduction plan, forest-related strategies should focus on reductions that are readily achieved, controlled and measured.

Burning Wood Has Very High Carbon Costs.

Because bioenergy production converts large amounts of carbon to atmospheric carbon dioxide ("CO2") regardless of what technology is used, a full accounting of the climate impacts is necessary in assessing the ultimate GHG reductions to be achieved by SLCP reduction strategies related to biomass energy. Wood-burning power plants emit roughly three times as much CO2 as natural gas plants per megawatt-hour of energy produced. This excess CO2 can persist in the atmosphere for decades or even centuries, depending on the source of the wood used as fuel, even when "net" CO2 reductions from forest regrowth or avoided emissions are taken into account.

Moreover, wood-burning power plants produce far higher quantities of air pollutants like nitrogen oxides, particulate matter, and carbon monoxide per megawatt-hour than the natural gas plants they are intended to displace. Furthermore, expanded utilization of biomass, especially wood sourced from forests, could drive demand for more intensive logging operations that can harm habitat, wildlife, and water quality. All of these values would need to be considered to fulfill the mandate of SB 605 to prioritize measures that offer co-benefits by improving water quality or reducing other air pollutants that impact community health and benefit disadvantaged communities.

The Role of Biochar

We support CARB employing a cautious approach and further investigating the potential benefits of biochar. While biochar holds promise as a means of sequestering carbon in the soil, and can offer a means of improving certain soil types, it could also serve as an example of "too much of a good thing is still too much."[14] While serving the goal of at least temporarily sequestering carbon within the soil,[15] its use in amounts beyond what might reasonably be considered to be appropriate as a soil amendment could alter soil ecology in ways that may not be either desirable[16] or (easily) reversible. Moreover, in the absence of a well thought-out biochar program, encouraging the large-scale use of biochar could result in the unintended consequence of fostering an industry more interested in the production of the char as the primary product, rather than the other beneficial products that could be yielded from woody biomass. If the biochar industry were to achieve a large industrial scale, the production, handling and use of the biochar could itself ironically become a significant source of black carbon. There are implications too, if California policy were to incentivize the development of unregulated industry outside the state's borders. Given its complex interactions with the soil, each application and use (or application type or use type) of biochar should likely be thoroughly evaluated for its effects including on GHG emissions from the soils due to its interaction with the soil nutrient cycle and the unpredictable lability

[14] The bright prospect of biochar. Nature Reports Climate Change 2009 doi:10.1038/climate.2009.48 http://www.nature.com/climate/2009/0906/full/climate.2009.48.html, Spokas, et. al., 2012. Biochar: A Synthesis of Its Agronomic Impact beyond Carbon Sequestration. JEQ 41(4): 973-989, doi:10.2134/jeq2011.0069 https://www.agronomy.org/publications/jeq/abstracts/41/4/973

[15] Dungait et al., Soil organic matter turnover is governed by accessibility not recalcitrance. Global Change Biology, 18(6): 1781–1796, June 2012 DOI: 10.1111/j.1365-2486.2012.02665.x http://onlinelibrary.wiley.com/doi/10.1111/j.1365-2486.2012.02665.x/abstract, Schmidt, et. al., 2012. Persistence of soil organic matter as an ecosystem property. LBNL Paper LBNL-5135E http://escholarship.org/uc/item/49r8v2b5#page-1

[16] Augustenborg et. al, 2012. Biochar and Earthworm Effects on Soil Nitrous Oxide and Carbon Dioxide Emissions. JEQ 41(4): 1203-1209. doi:10.2134/jeq2011.0119 https://www.agronomy.org/publications/jeq/abstracts/41/4/1203, Gajić and Koch. 2012. Sugar Beet (Beta vulgaris L.) Growth Reduction Caused by Hydrochar Is Related to Nitrogen Supply. JEQ 41(4):1067-1075. doi:10.2134/jeq2011.0237 https://www.agronomy.org/publications/jeq/abstracts/41/4/1067, Crane-Droesch et. al, 2013. Heterogeneous global crop yield response to biochar: a meta-regression analysis. ERL 8(4), 044049. doi:10.1088/1748-9326/8/4/044049 http://iopscience.iop.org/1748-9326/8/4/044049

of the biochar. Biochar is likely another example of "one size does not and cannot fit all", and its GHG and other impacts need to be determined at the project level.

Sustainability

CARB should ensure that it addresses the sustainability of any strategies seeking to reduce black carbon emissions from the burning of biomass. In adopting strategies seeking to collect and use biomass (such as forest trimmings and residues, etc.) in order to reduce open burning and wildfire risk CARB should make sure that those strategies do not inadvertently provide cover for illegitimate biomass harvesting or otherwise lead to damaging impacts on ecosystems. While sustainability guidelines were developed for the CEC's Alternative and Renewable Fuel and Vehicle Technology Program or AB 118 program[17] and for the purposes of implementing SB 1122 (Rubio, Chapter 612, Statutes of 2012) at the CPUC,[18] these guidelines are for programs with limited scope.[19] In pursuing a comprehensive statewide strategy that seeks to address black carbon emissions from biomass these sets of guidelines should be viewed as the starting point for developing more comprehensive sustainability standards. In informing how CARB can address sustainability issues under a comprehensive SLCP reduction plan, CARB could harmonize its work on the Forest Carbon Plan and on the Low Carbon Fuel Standard with these already existing guidelines.

STRATEGIES TO REDUCE F-GASES

We wholeheartedly support CARB's goal of reducing the use of HFCs within the state by at least 80 percent by 2030 by moving forward with new measures that seek to grow markets for low-GWP alternatives while leveraging other leading national and international efforts to strengthen the market signal accelerating the transition away from high-GWP refrigerants.

We support CARB moving forward with bans on the use of HFCs in insulating foams not already affected, and on aerosol propellants for consumer products (with the possible exception of certain prescription pharmaceuticals). CARB should also move immediately (if faced with federal inaction) to eliminate the use of high-GWP refrigerants in air conditioners and refrigeration systems for heavy-duty trucks.

We also support CARB working with other agencies and industry stakeholders to consider additional incentives, funding, and collaborative efforts to significantly reduce emissions from F-gases during their use and end-of-life. This could be especially important where such efforts can identify and rapidly expand the use of systems that can improve energy efficiency while operating on low-GWP refrigerants (especially natural refrigerants such as ammonia and/or CO_2, used either in separate or combined applications), particularly in the commercial sector.

We agree that the monitoring and enforcement of best practices during the use and end-of-life of appliances poses a considerable challenge and look forward to working with staff and other stakeholders to improve outcomes in this area.

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[17] CEC, April 22, 2009. Final Program Regulations for the Alternative and Renewable Fuel and Vehicle Technology Program. http://www.energy.ca.gov/ab118/documents/

[18] CalFire, November 22, 2013. Forest Sustainability and Feedstock Verification Recommendations. https://8c761e4dbbccacbe30769daf80a612dae01de882.googledrive.com/host/0B-l5Em3Jm2k8VUt4c1RKeHJFTGs/CalFireSNCSB1122

[19] We would like to note that some of us were involved with the development of these guidelines.

We thank CARB staff for the opportunity to comment on the *Concept Paper* and look forward to working with staff and other stakeholders to develop the State's Strategy for significantly reducing SLCPs by 2030. We again commend CARB staff for their excellent work in preparing a comprehensive and thoughtful *Concept Paper*. Please do not hesitate to contact any of us if you have any questions.

Sincerely,

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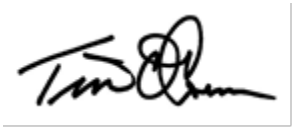

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